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ABSTRACT

This study was designed to validate Arthur Chickering's theory of student development, from both the perspective of assessing several of the vectors that Chickering described and by examining the factors that Chickering deemed important in affecting development along these vectors. Chickering proposed seven vectors of development for the typical college student: (1) developing competence, (2) managing emotions, (3) developing autonomy, (4) establishing identity, (5) developing mature interpersonal relationships, (6) clarifying purpose, and (7) developing integrity. This longitudinal study involved surveys of 242 members of the freshman class of 1995 at a small, selective, religiously affiliated college. It examined five influences on student development during the freshman year: living arrangements, environmental influences, peer experiences, faculty-student interactions, and extracurricular involvement. Findings validate much of Chickering's theory, as developmental change did occur and several of the variables (faculty student interactions, participation in activities, and peer interactions) had significant effects on several developmental measures. Implications of the study for student affairs and academic affairs practitioners are outlined. (Contains 36 references.) (JDD)

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Developmental Change in Freshman Students:

Validating Chickering's Theory of Student Development

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October 5, 1994

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This paper was presented at the annual meeting of the Association for the Study of Higher Education held at the Doubletree Hotel, Tucson, Arizona, November 10-13, 1994. This paper was reviewed by ASHE and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC collection of ASHE conference papers.

Introduction

Colleges and Universities have always been responsible for influencing their students so that they graduate with improved knowledge, skills, attitudes and values. Arthur Chickering, author of one of the more prominent theories on college student development stated "the overarching purpose of our colleges and universities should be to encourage and enable intentional developmental change in students" (Chickering, 1981).

Of all the college years, the freshmen year is generally considered to be one of numerous and significant changes. Pascarella and Terenzini (1991) reviewed studies by Lehmann (1963) and Heath (1968) which concluded that the freshmen year was particularly important in establishing patterns for subsequent developmental growth. Lehmann and Heath determined that later growth was simply a stabilization and integration of growth patterns established as early as the first few months of college.

The results of previous research acknowledge that student development does occur during the course of the freshman year and that interaction with the college environment has a significant influence on development. Pascarella and Terenzini (1991) conclude "that on nearly all of the dimensions on which we find freshman to senior change, a statistically significant portion of that change is attributable to college attendance, not to rival explanations....These effects cannot be explained away by maturation or by differences between those who attend and do not attend college in intelligence, academic ability or other pre-college characteristics..." (p. 567).

Literature Review

The student affairs profession can trace its concern for student development and its associated outcomes back to the colonial colleges (Miller, 1982). In 1949, the American Council on Education in its Student Personnel Point of View issued a statement that strongly implied that all development should become part of the mission of an institution (Miller and Prince, 1977). To accomplish this mission, all educators, including student affairs professionals, must be able to identify the particular resources and opportunities that they can provide for their students in order to facilitate "optimal" development.

Widdick et al. (1985) identified four key questions which must be addressed in order to attempt to intentionally modify development in students that attend our institutions. The questions are as follows:

1) Who is the college student in developmental terms? What developmental changes occur and what do those changes look like?

2) How does the process of development occur? What are the psychological and social processes that cause development?
3) How can college environments influence student development? What factors in the particular and distinctive environment of a college or university can either encourage or inhibit growth?
4) Towards what ends should development in college be directed? (p. 77)

Hanson (1982) adds that other important areas for consideration include: monitoring the develcpmental progress of students to begin to identify the way students change in relation to programmatic efforts; planning for the delivery of services and designing the instructional curriculum by combining both descriptive data and data on student progress; and evaluating the effects of our educational efforts on the student by examining the effects of specifically designed programs on given changes in measured student development.

While the importance of assessment of developmental outcomes as described above is acknowledged, the theoretical constructs behind any assessment strategy are crucial to the understanding of changes in developmental levels that may occur. Our current understanding of the theory behind student developmental change began in the late 1950's with a survey of the impact of college on values by Jacobs. This study prompted a flood of research on college students (Pascarella and Terenzini 1991). In 1969, Chickering indicated that most prior efforts had been exploratory in nature and that few theories have been framed and few hypotheses tested.

There are many different theories in existence today proposing different schemes for viewing developmental change in our students. One drawback of many of these theories is that the college years are only considered one phase of development. Chickering's Theory of Student Development (1969, 1993) is unique among developmental theories. It focuses exclusively on development during the college years, rather than lifelong development. Another important consideration for college administrators is not only identifying development with the aid of some theory, but also identifying those factors affecting development that will produce the most positive change in our students. Chickering's theory is also different from other theories because in addition to explaining the developmental process, his theory identified several institutional factors hypothesized to exert influence over a student's development: (1) Clarity of institutional objectives; (2) Institutional size; (3) Curriculum and teaching; (4) Friendships and student communities; (5) Contact with faculty; (6) Student development programs and services; and (7) creating educational powerful environments.

Chickering (1969) was the first to develop a framework to synthesize and integrate the existing literature and focus exclusively on college student development. Its primary aim was "to be of use to those concerned with higher

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education, its present forms and future potentials" (p. 5). His book, Education and Identity (1969), also used empirical data from the Project on Student Development in Small Colleges, a study of thirteen liberal arts colleges conducted to identify the effects of interactions between student characteristics and collegiate press on attrition and personality change (Widdick et al., 1978). Chickering's intent was to combine existing theory and evidence into a pattern of developmental changes that would establish a conceptual model that could span the continuum from the college student as a developing being to educational practice (Widdick et al. 1978). He wanted to "make information accessible to college and university faculty members so that they would have ways of thinking about how their educational programs could be organized to encourage such development in more systematic and powerful ways" (Thomas and Chickering, 1984, p. 393). His thesis stipulated:

> ...that not all students change along all seven vectors, nor that the environmental conditions operate with equal force for all students at all institutions, but that such changes do occur for some students and they can occur more frequently for others. Environmental conditions at some institutions do foster or inhibit such changes, and systematic modification can increase the frequency of valued development. (Chickering, 1969, p.5) .

Chickering's review of the literature identified seven key areas of development, which he labeled "vectors" in which students change during their college years. Each vector can be seen as a series of developmental tasks, a source of concern, and a set of outcomes. The vector specifies in psychological terms the nature and range of tasks, defines the central concerns, and finally delineates changes in self-awareness, attitudes and skills which are manifestations of successful task completion (Widdick, et al., 1978). Development along the vectors involve cycles of differentiation and interaction and challenge and response. The surrounding environmental influences described above, provides the challenge and support (Chickering, 1969).

While Chickering's theory is perhaps the most widely recognized and popular theory of developmental change in college students, there has been little research that has focused on the continued refinement and assessment of his conceptualizations (Hansen, 1982). In fact, Hansen notes that in the period from 1970- 1982, there were less than ten empirical studies documenting the theoretical writings of **any** (including Chickering) of the major student development theorists.

Two studies have looked specifically at the validity of Chickering's Vectors of Student Development in describing the developmental process. The most notable of these is White and Hood (1989). White and Hood's purpose was to provide empirical validation of Chickering's Vectors through factor analysis of sub-scales of the Iowa instruments.

and to test the validity and reliability of the Iowa Instruments, a series of scales each designed to measure on of Chickering's vectors.

White and Hood concluded that their investigation supported prior research by the developers of each of the individual Iowa instruments that certain aspects of Chickering's theory could be reliably measured and quantified. They also noted that the factor analysis provided only limited evidence in support of Chickering's theory. Only four of Chickering's seven vectors coincided with the results of the factor analysis even though these instruments were designed to measure all seven vectors.

While White and Hood's efforts seem to only provide a partial validation of Chickering's theory, a second study conducted by Widdick et al. (1978), noted that Chickering's research findings generally substantiate patterns of growth hypothesized by the vector model that he developed. They reviewed other research studies that have been conducted on changes in student attitudes, goals and behaviors while in college. Using convergent validation, Widdick et.al. discussed the question of the validity of Chickering's theory based on other literature that supports the general conclusions of the Chickering model.

As these two studies indicate, individual components of Chickering's Theory of Student Development have been identified as valid and measurable by various authors. However, the theory when taken as a whole, has only had, at best, partial validation from White and Hood. In addition, neither of the studies reviewed above attempt to validate Chickering's assumptions on the influences on development. Since Chickering's theory is widely used and considered by many practitioners, the testing of this theory, both the vector descriptions and the hypothesized influences on development, is an area where future research studies are sorely needed. The current study has been designed to validate Chickering's theory from both the perspective of assessing several of the vectors that Chickering described and by examining the factors that Chickering deemed important in effecting development along these vectors.

Description of the Problem

Pascarella and Terenzini (1991) state that "untangling the web of within-institutional influences on student change remains a conceptually and technically formidable but potentially promising area of future research" (p.328). They also indicate in their review of how colleges affect students that little research has been done which examines the

characteristics of the higher educational setting which are thought to influence affective student development within a given institution (these are referred to "with-in college effects" or the effects of different sub-environments and experiences on student development). Given the identified lack of research in this area, and the fact that although Chickering's theory is extensively used, it has never been subject to a direct empirical test of his environmental influences on development, this study has two purposes: (1) to directly test several of the environmental factors that Chickering deemed most important in influencing development on developmental change in freshman students. A causal model of affective student development was developed which identifies the relative contributions and influences on development (both direct and indirect) of several of the pertinent factors of attending college described by Chickering (1969) (see Figure 1); and (2) to identify those factors that were most effective in influencing developmental change.

Research Questions

Based on the general purposes of the study discussed in the previous section, this study will attempt to answer following specific research questions:

1. What are the direct and indirect effects on affective student development of the following five influences: a)living arrangements; b) environmental influences; c) peer experiences; d) Faculty-Student interactions; and e) extracurricular involvement (based on Chickering's Theory of Student Development)?
2. Does the resulting path model reflect the influences that Chickering deemed important in effecting affective student development? Does the resulting model validate Chickering's original hypotheses regarding development and its respective influences?
3. Which of the five influences in the model are most effective in producing positive developmental change, given certain entry characteristics? Are there any implications for practical applications of this model of development?

Methodology

The investigation involved a longitudinal study of student development during the freshmen year. As noted above, it has been shown that a majority of changes in student development occur during the first and second years

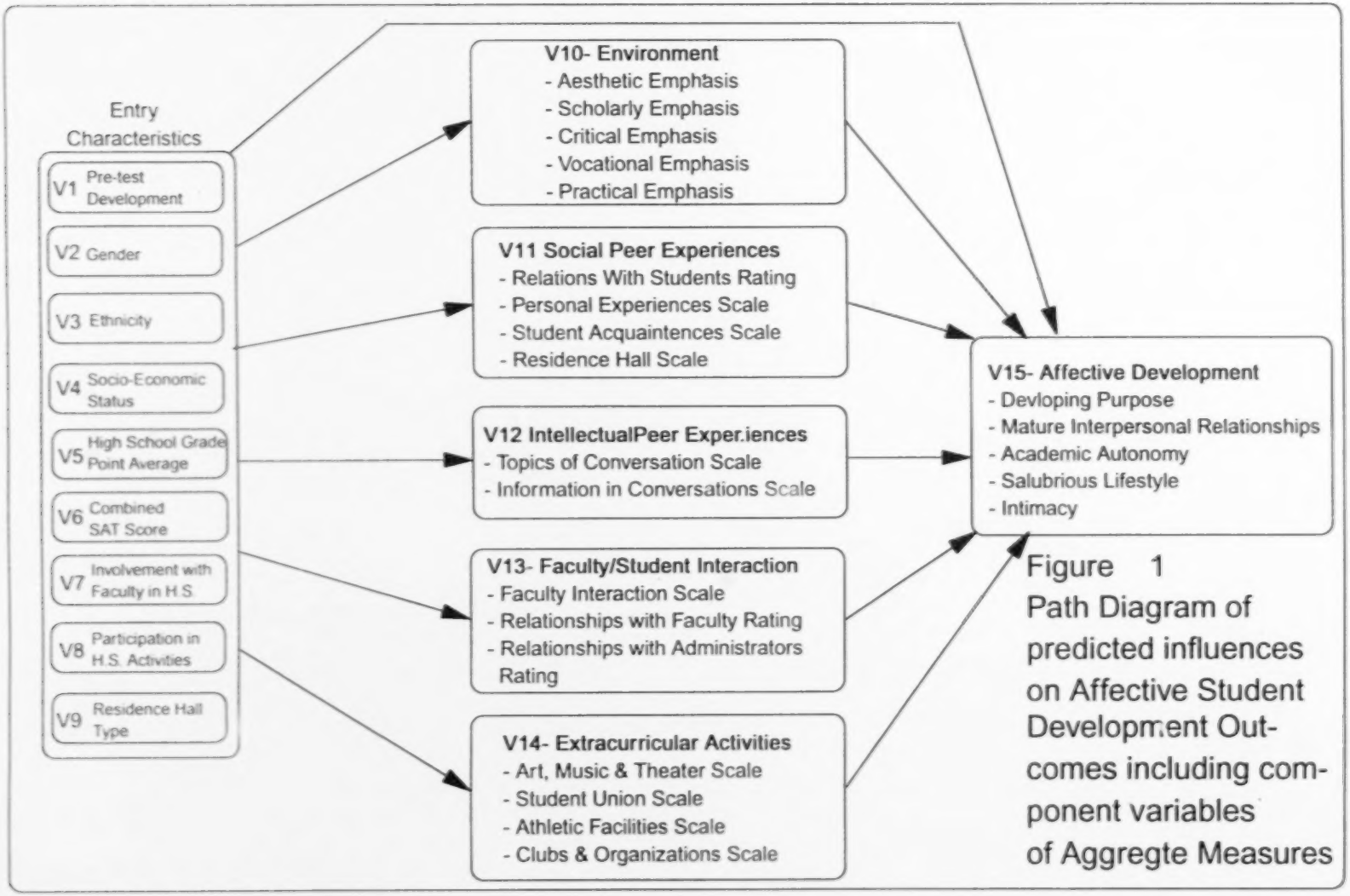

Figure 1
Path Diagram of predicted influences on Affective Student Development Outcomes including component variables of Aggregte Measures

of college. The population studied was the entire freshmen class of 1995 at a small, selective, religiously affiliated, Carnegie Classification Comprehensive II College (Carnegie Foundation for the Advancement of Learning, 1987). The study used several of the environmental variables that Chickering established as important in influencing student development in his book Education and Identity (Chickering, 1969). The model was designed specifically to empirically validate portions of his theory by examining developmental levels of students and how these levels are affected by several of the environmental variables that Chickering considered important in influencing affective student developmental levels at a single institution over the course of the freshman year. Environmental variables examined include: (1) Ratings of the Environment; (2) Peer Relationships; (3) Residence Type; (4) Faculty/Student relationships; and (5) Participation in Extracurricular activities.

Data were collected using three primary instruments. A self-developed demographic questionnaire was used to collect background information on the students as well as information on activities in high school and aspirational data. This instrument is comprised of exclusively self-report data. Initial and final developmental information was collected with the Student Development Task and Lifestyle Inventory (SDTLI) (Miller and Prince, 1987). This instrument, which is based on Chickering's (1969) model of development, is specifically designed to assess development along Chickering's vectors in the areas of Purpose, Mature Interpersonal Relationships, Academic Autonomy, Salubrious Lifestyle (Wellness), and Intimacy. This instrument also uses self-report to identify resolution of developmental tasks. Environmental measures were established using the College Student Experiences Questionnaire (CSEQ) (Pace, 1992). This instrument contains perceptual data and self-reports of involvement in the college experience, ratings of the college environment, and estimations of personal gains as a result of the college experience to assess dimensions of involvement and the institutional environment.

Both the SDTLI and the CSEQ have undergone multiple revisions since their initial release. Significant normative data bases have been established for both instruments. In addition, both the SDTLI and the CSEQ have undergone extensive validity and reliability studies.

Data were collected at two points during the freshman year. On opening day of freshman orientation, students were given the demographic questionnaire and the SDTLI. For those students not living in campus residence halls (n=36), instruments were mailed with an attached cover letter, instructions for completing the questionnaires and return envelopes. 354 Surveys were collected representing an 87% sample of the entire freshman class. The

sample was found to representative of the entire population with respect to gender, ethnicity, socioeconomic status, SAT scores and Higher School grade point average, based on comparative data provided by the admissions office of the college about the entering class of 1991.

In April, at the end of the freshman year, students were issued a second testing of the SDTLI and the CSEQ. Commuter students were again mailed coded questionnaires with instructions, a cover letter, and return envelope for the survey. Of the 360 students still in attendance at the college at the end of the Spring semester, 242 completed surveys were collected, representing a 67% sample of the students completing the freshman year. This sample was also found to be generally representative to the overall population of the college with respect to gender, ethnicity, socioeconomic status, SAT scores and Higher School grade point average.

The pre- and post-test data were combined using social security number as identification. Only those students completing the demographic survey, the SDTLI pre-test, the CSEQ **and** the SDTLI post-test, were included in the sample. All other data was not included in the study. The resulting sample population after combining the three instruments was n=194.

Cronbach's Alpha test of internal consistency (Cronbach, 1970) were run on both SDTLI pre- and post-test, CSEQ and all aggregate variables. Correlation matrices were generated for the same instruments to determine inter-item correlations among the variables. These tests were compared with normative data established by the developers of the respective instruments. Alpha coefficients for both the pre- and post-test SDTLI compare favorably with reliability estimates established for the normative sample. In most cases the estimates in the two sample populations in this study are slightly lower than the normative sample reliability estimates. As with the SDTLI scales, all of the scales on the post-test CSEQ compare favorably, although again generally slightly lower, than the alpha coefficients established in the normative sample. Reliability estimates for the normative sample range from .83 to .96. Estimates for the sample population range from .86 to .89.

In addition, reliability estimates were established for the three scaled variables on the demographic survey: college finances; interaction with faculty in high school; and participation in high school activities. Reliability estimates for these constructs ranged from .59 to .81. Finally, Cronbach's Alpha reliability estimates were also run for the aggregate variables which were combined to form factors in the structural model. Reliability estimates for these constructs ranged from .51 to .82.

There were two parts to the statistical analysis of the data generated. The initial procedures ran were designed to "treat" the data set to compensate for missing values within observations and to eliminate observations suspected of bias, and to establish descriptive statistics for the sample population for comparisons to the entire freshmen class. The second portion of the statistical analysis was the testing of the causal model to calculate the direct and indirect effects within the proposed structural model. For all statistical tests, a .05 level of significance was used as a minimum criteria for significance to control for the possibility of a Type I error.

Many of the individual observations within the final sample contained missing values on one or more of the variables examined. Most structural equation modeling packages require that every observation be complete. Any observation that does not meet this criterion is dropped from consideration in the model. Based on this requirement and the desire to maintain an adequate sample size, it was decided that the mean value for all missing scaled variables would be inserted in those observations with missing values. This procedure is known as "plugging the mean" (Borg and Gall, 1989). Because the primary statistical analysis of this study is regression, which is based on differences from the mean, inserting the mean value into observations with missing data should have no effect on the analysis.

Mean values were inserted for all scaled variables on those observations that contained missing data. Categorical variables that had missing values resulted in that entire observation being dropped from consideration in the model. In order to insure that there were no significant differences between those students who responded to a given scale and those that did not, a series of t-tests were run for those variables that had more than ten observations with means plugged into missing scores. Only four of the fifty tests run were significant at the $P<.05$ level, which is only slightly higher than chance.

Initial review of the data for the sample population indicated that there were only seven commuting students as compared to 185 residential students. Because the variable place of residence appears so early in the model, it was felt that such a skewed population with a minimal variance would adversely effect all later calculations within the model. Therefore, the seven observations representing the commuter population were dropped from consideration in the model. The resulting sample population for the study was reduced to n=185.

A final treatment of the data was accomplished with regards to the response bias scale contained within the SDTLI instrument. Winston and Miller (1987) developed a response bias scale as part of the SDTLI in order to

attempt to identify those students who tried to paint an unrealistic portrait of themselves or those students who were careless in filling out the inventory. The authors of the instrument suggest that any survey with a response bias scale of three or more be dropped from consideration. Analysis of the data set indicated that a total of 26 observations contained response bias scores of three or more on either the pretest, the post-test or both. These observations were dropped from consideration in this study.

The final sample had 153 observations, representing a 39.2% sample of the original freshman class. The sample was compared with initial freshman class data and was found to be representative with respect to gender, ethnic status, SAT scores and High School grade point average.

Five separate path models were developed representing the five developmental scales contained in the SDTLI (Purpose, Mature Interpersonal Relationships, Academic Autonomy, Salubrious Lifestyle, and Intimacy (see Figure 1). Hypothesized paths in the model were determined in part by direct references in the literature to known effects and through common sense predictions of presumed effect. CALIS, a structural equation modeling program similar to LISREL was used to analyze the path models. It is particularly effective in analyzing structural models because it not only allows the researcher to analyze and test the goodness of fit of the model, but it also to fix or constrain model coefficients, to do multiple group comparisons, distinguish between latent constructs and observed indicators and readily estimate reciprocal causal flow in models (Stage, 1990). In addition, CALIS allows the researcher to calculate both the direct and indirect effects of variables on subsequent variables in the model. The model generates correlations, both direct and indirect, between variables along the paths that were hypothesized in the original model.

Significance levels for the direct effects were calculated using standard t-tests by dividing the metric direct effect by the standard error of the indirect effect. Significance levels of the indirect effects were estimated using Stepwise Multivariate Wald tests, which compare model significance first with all paths and then with some paths excluded. Chi-square statistics for each of the models are compared, the result of which is also a Chi-square statistic.

Findings

There are a total of thirty-six variables derived from three separate instruments, that were examined in this study. Eighteen of these variables were used to establish the independent variables (environment, social peer

Table 1
Descriptive Statistics for all Model Variables
(n=153)

Variable	Mean	SD	SK	Kur	Range
Pre-test Development					
Purpose	30.7255	9.4780	-0.0807	-0.4567	48.0
Mature Relationships	12.2780	4.9577	0.0656	-0.3637	24.0
Academic Autonomy	4.6118	2.3502	0.0698	-0.7602	10.0
Salubrious Lifestyle	5.0719	2.0200	-0.3905	-0.5063	8.0
Intimacy	9.8844	2.6285	-0.4416	1.6980	17.0
Gender	1.6316	0.4840	-0.5510	-1.7192	1.0
Ethnicity	4.7961	0.6842	-3.4886	12.6441	5.0
Socio-Economic Status	24.6543	11.0190	0.3203	-1.0439	38.0
HS Grade Point Average	4.8404	0.8543	-0.3946	-0.0885	4.0
SAT Score	1061.5930	125.8404	0.0066	2.7575	950.0
HS Faculty Involvement	9.4868	5.7486	0.4760	-0.1038	25.0
HS Activities	12.1908	6.2229	0.7305	0.6266	25.0
Residence Type	0.7368	0.4418	-1.0865	-0.8307	1.0
Environment	**26.1869**	**4.5036**	**-0.4927**	**0.8720**	**25.0**
Aesthetic Emphasis	5.0590	1.2672	-0.4485	0.0664	
Scholarly Emphasis	5.7673	0.9522	-0.8205	1.1797	
Critical Emphasis	5.2248	1.1228	-0.5125	0.1532	
Vocational Emphasis	4.8262	1.3654	-0.3598	-0.2369	
Practical Emphasis	5.2976	1.2277	-0.6970	0.7240	
Personal/Social Exper.	**85.0372**	**14.3851**	**0.2457**	**-0.3228**	**73.0**
Relations with Students	5.8618	0.9353	-0.9009	1.3614	
Personal Experiences	24.0469	6.3611	0.3889	-0.3639	
Student Acquaintances	27.4900	5.8658	0.4410	-0.4129	
Residence Halls	27.8427	5.3326	0.1827	-0.3306	
Intellectual Exper.	**36.7910**	**7.9657**	**0.5478**	**0.9490**	**44.0**
Conversation Topics	22.5744	5.3541	0.7730	1.0939	
Info in Conversations	14.3139	3.3803	0.5297	0.4234	
Faculty/ Student Interact.	**31.3031**	**6.1286**	**0.3053**	**0.1396**	**32.0**
Faculty Scale	21.0024	5.1243	0.9026	0.6255	

Table 1 (Cont.)
Descriptive Statistics for all Model Variables
(n=153)

Variable	Mean	SD	SK	Kur	Range
Fac./ Stud. Int. (cont)					
Relations with Faculty	5.6053	1.0867	-0.8863	0.6949	
Relations with Administrators	4.7566	1.5738	-0.7880	0.2509	
Extracurricular Activities	83.2215	15.0219	0.8082	1.3789	89.0
Art, Music & Theater	18.7961	5.8600	2.1222	6.3725	
Student Union	21.9312	6.1901	0.4923	0.8044	
Athletic Facilities	23.7234	6.3906	0.3795	0.0169	
Clubs & Organizations	18.8381	5.1832	1.1387	1.7346	
Post-test Development					
Purpose	35.9673	11.0038	-0.1397	-0.2247	58.0
Mature Relationships	12.2745	4.7673	0.1662	-0.3781	22.0
Academic Autonomy	5.1895	2.4259	-0.0386	-0.8506	10.0
Salubrious Lifestyle	4.9869	2.0806	-0.2311	-0.7047	8.0
Intimacy	10.4275	2.6435	-0.4416	1.6980	18.0

relationships, intellectual peer relationships, interaction with faculty and participation in extracurricular activities). The independent variables were derived by summing several variables each to form aggregate variables represented in the predicted structural model. The remaining eighteen variables in the study comprise the pre- and post-test developmental scores, and the demographic variables established as described above (see Figure 1) Descriptive statistics for these variables can be found in Table 1.

Goodness of Fit, Root Mean Residual statistics and the Total Coefficient of Determination were established for each of the five structural equations used in this study. The results of these measures of model significance can be found in Table 2. Goodness of Fit indices for each of the models ranged from 0.8156 to 0.8147. Root Mean Squared residual scores ranged from 0.1084 to 0.1163. Both of these measures indicate that the model used fits the data set fairly well. Model r^2 scores ranged from 0.0394 for the model describing Intimacy to 0.4316 for the model representing Purpose. Three of the five models had r^2 values of .38 or higher indicating a relatively high proportion of the total variance in the models explained. Nora (1987) indicates that these indices are important in

Table 2
Measures of Model Significance for Five Structural Equations

Developmental Variable	Goodness of Fit Index	Root Mean Squared Residual	Model r^2	Prob.=χ^2
Purpose	0.8407	0.1084	0.4316*	0.0001
Mature Relationships	0.8156	0.1162	0.4232*	0.0001
Academic Autonomy	0.8359	0.1087	0.1424*	0.0001
Salubrious Lifestyle	0.8178	0.1163	0.3802*	0.0001
Intimacy	0.8417	0.1056	0.0394	0.0001

*p<.001

determining the significance of the entire structural model.

Most developmental theories propose positive developmental change as a result of experiences during college. Chickering's Theory of College Student Development is no exception. In order to establish the nature and significance of change during the freshman year, a series of t-tests were run comparing pre- and post-test development difference scores. Results for these tests can be found in Table 3.

Table 3
Differences between Pre and Post Test Means for Developmental Scales

Variables	N	Mean Difference Score	Std. Dev.	t Value	Probability
Purpose	153	5.2418	9.9333	6.5273	0.0001
Mature Relationships	153	0.0065	4.1935	0.1928	0.9846
Academic Autonomy	152	0.5921	2.6379	2.7674	0.0064
Salubrious Lifestyle	153	-0.0850	1.8207	-0.5772	0.5646
Intimacy	153	0.5431	3.1140	2.1573	0.0326

Statistically significant positive developmental change was found for Purpose, Academic Autonomy, and Intimacy. All three tests were significant at p<.05 or better. The Mature Interpersonal Relationships Task showed a very small and statistically insignificant increase in mean scores between the pre- and post-tests. An interesting result is that the mean score for the Salubrious Lifestyle Scale actually shows a slight, but statistically insignificant

decline during the freshman year. These results indicate that significant change does occur during the freshman year in several of the developmental measures examined.

Four of the models examined in this study had statistically significant amounts of the variance explained in the dependent variable for the total model. It was expected that the pre-test development variable would account for significant amount of the variance in post test scores on the same measure. However, when the total model variance was viewed relative to the amount of variance explained by pre-test development scores, three of the models examined (Purpose, Academic Autonomy, and Salubrious Lifestyle) showed additional variance explained by the five endogenous variables of eleven, three and two percent respectively. This lends credence to the ability of the SDTLI to discern change over the course of a single year.

The results of the path analysis indicate that statistically significant relationships exist between several of the environmental variables predicted to influence developmental change in the vectors examined. These changes were consistent with Chickering's original hypotheses regarding these vectors. Two of the five models examined (Purpose, Academic Autonomy) indicated significant relationships between the independent variable faculty-student interactions and the post-test development level (see Figures 2 and 4). This supports virtually all prior research on the effects of informal faculty interactions on affective student development. Two of the five models (Purpose and Salubrious Lifestyle) indicated significant relationships between participation in activities and post-test developmental levels (see Figures 2 and 5). This again validates the literature which says that a student involved in his or her institution, including participation in extracurricular activities, will likely show greater development than peers who are not.

Of the five models examined, only one (Academic Autonomy) found a significant relationship between the independent variable social peer interactions and the dependent variable post-test development (see Figure 4). Two of the independent variables examined, environment and peer intellectual interactions, showed no significant relationships with the dependent variable, post-test development, for any of the models examined. In the areas of faculty-student interactions, participation in activities, peer interactions and residence arrangements, the results of this study confirm Chickering's original hypotheses regarding developmental influences.

For the model describing Purpose, the dependent variable, developing a sense of Purpose was found to have significant relationships with two of the independent variables and one of the exogenous variables in the model (See

Figure 2). Not surprisingly, pre-test development was highly significantly related to the post-test developmental score (β= 0.49978, p< .001). Additionally, level of interaction with faculty (β= 0.24665, p< .01) and level of participation in extracurricular activities (β= 0.16736, p< .05) were found to be significantly and positively related to the students' resolutions of the developing purpose task. This confirms previous research for both participation in activities and interaction with faculty in relation to gains in affective development. Students who are more active in college in terms of participation in activities and those who take advantage of faculty as an additional positive resource, showed increased development along the Purpose task over their peers during the freshman year.

Significant indirect effects on post-test development were found for the Purpose model for pre-test developmental level (χ^2[5,n=153]= 25.9525, p<.01) and combined SAT scores (χ^2[5,n=153]= 11.9715, p<.05). Pre-test developmental level exerts indirect effects on post-test development through four variables: Peer Social Experiences, Peer Intellectual Experiences, Faculty Student Interaction, and Participation in Extracurricular Activities. Significant indirect paths for the influence of pre-test development level on post-test purpose scores were through Faculty Student Interactions (β= 0.36976, p< .001) and Participation in Activities (β= 0.22363, p< .05). These results indicate that the students level of accomplishment for the Purpose task upon entry to college has a significant impact on the experiences that the students will undergo during the freshman year, especially with respect to interaction with faculty and participation in extracurricular activities. The more mature and personally directed student upon entry to college has higher levels of interaction with faculty and participation in extracurricular activities. These students tend to take better advantage of the opportunities that exist at the college, using all resources available to enhance their college experience.

The model describing development of Mature Interpersonal Relationships during the Freshman year was found to have several significant paths characterizing relationships between variables within the model (See Figure 3). An unexpected result for the Mature Interpersonal Relationships structural model was that none of the predicted independent variables were significantly related to the post-test developmental scores. However, three of the exogenous variables: pre-test development (β= 0.56455, p< .001), ethnicity (β= 0.14454, p< .10), and SAT scores (β= -0.25475, p< .01) displayed significant relationships with post-test developmental levels on the MIR task. This indicates that students with lower SAT scores and non-minorities were more likely to have higher scores on the MIR

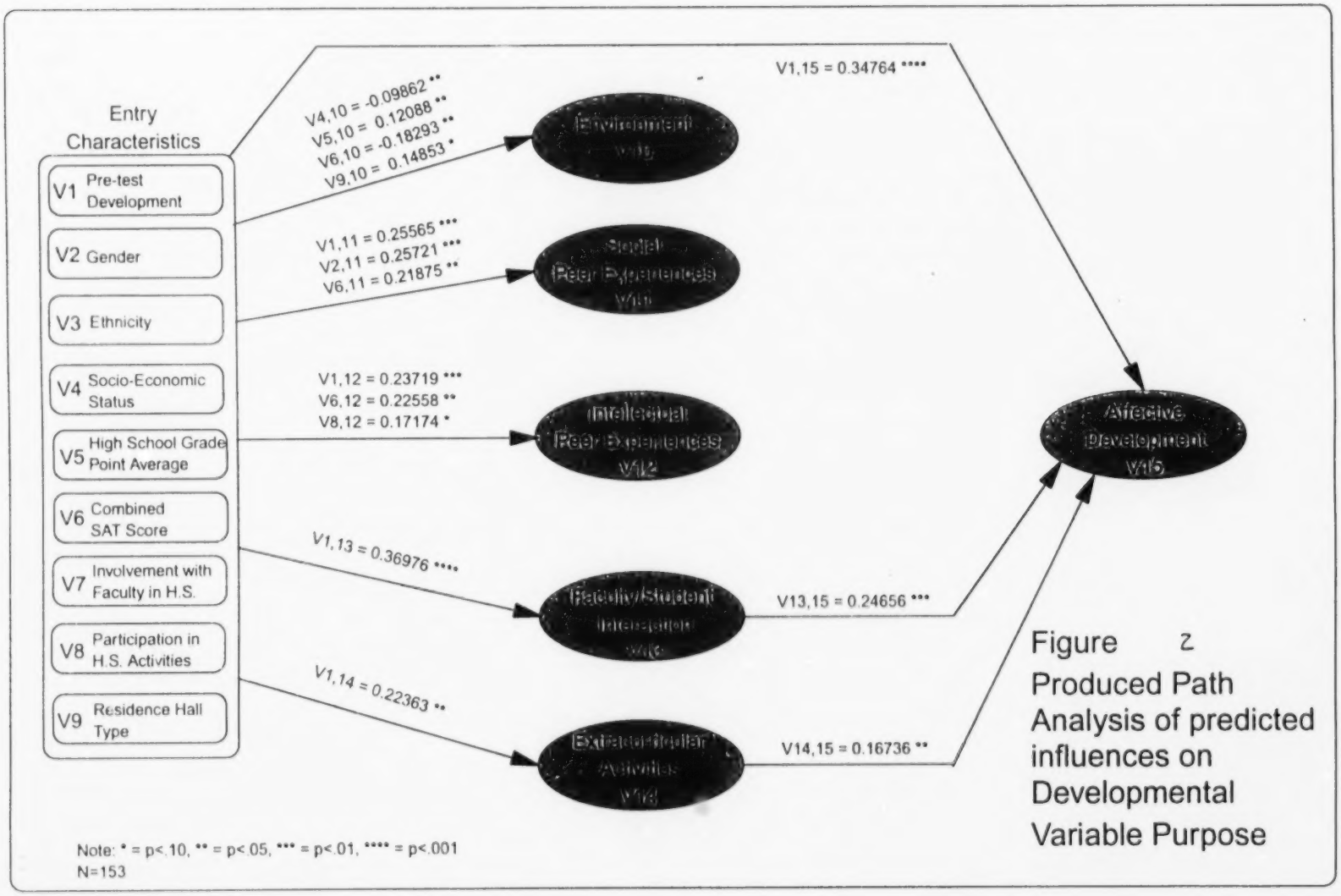
Entry Characteristics
V1 Pre-test Development
V2 Gender
V3 Ethnicity
V4 Socio-Economic Status
V5 High School Grade Point Average
V6 Combined SAT Score
V7 Involvement with Faculty in H.S.
V8 Participation in H.S. Activities
V9 Residence Hall Type
V4,10 = -0.09862 **
V5,10 = 0.12088 **
V6,10 = -0.18293 **
V9,10 = 0.14853 *
V1,11 = 0.25565 ***
V2,11 = 0.25721 ***
V6,11 = 0.21875 **
V1,12 = 0.23719 ***
V6,12 = 0.22558 **
V8,12 = 0.17174 *
V1,13 = 0.36976 ****
V1,14 = 0.22363 **
V1,15 = 0.34764 ****
V13,15 = 0.24656 ***
V14,15 = 0.16736 **
Affective Development V15
Note: * = p<.10, ** = p<.05, *** = p<.01, **** = p<.001
N=153

Figure 2
Produced Path Analysis of predicted influences on Developmental Variable Purpose

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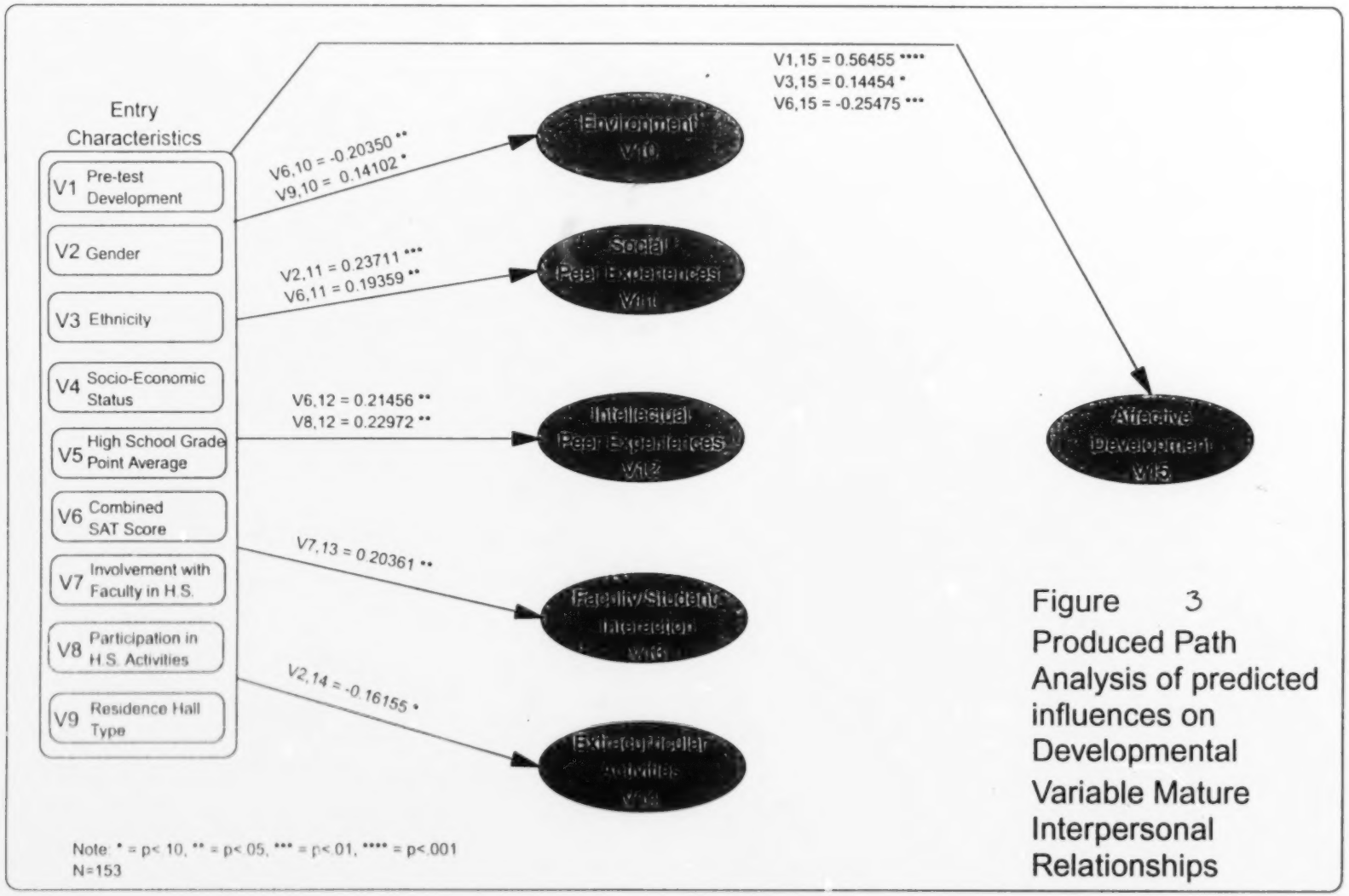
Entry Characteristics
V1 Pre-test Development
V2 Gender
V3 Ethnicity
V4 Socio-Economic Status
V5 High School Grade Point Average
V6 Combined SAT Score
V7 Involvement with Faculty in H.S.
V8 Participation in H.S. Activities
V9 Residence Hall Type
V6,10 = -0.20350 **
V9,10 = 0.14102 *
V2,11 = 0.23711 ***
V6,11 = 0.19359 **
V6,12 = 0.21456 **
V8,12 = 0.22972 **
V7,13 = 0.20361 **
V2,14 = -0.16155 *
V1,15 = 0.56455 ****
V3,15 = 0.14454 *
V6,15 = -0.25475 ***
Affective development V15
Note: * = p< .10, ** = p< .05, *** = p<.01, **** = p<.001
N=153

Figure 3
Produced Path Analysis of predicted influences on Developmental Variable Mature Interpersonal Relationships

task at the end of the freshman year. The latter finding is notable in that it would be expected that minority students at a predominantly white institution would have a more difficult time resolving the MIR task.

The model describing Academic Autonomy Task during the Freshman year was found to have several significant paths describing relationships between variables within the model (See figure 4). The dependent variable, Academic Autonomy, was directly influenced by two exogenous and two of the independent variables. As with the other models, pre-test scores on the Academic Autonomy task were highly significantly related to post-test scores on the same task (β= 0.32126, $p< .001$). In addition, gender was inversely related to gains in academic autonomy. This indicates that men had higher gains in levels of academic autonomy during the freshman year than their female counterparts.

The independent variable Peer Social Experiences was also found to be significantly related to gains in academic autonomy during the first year of college (β= 0.17654, $p< .05$). Students who had higher levels of social interaction with their peers also had higher scores on the academic autonomy task. Perhaps this is indicative that students who have a good balance between academics and social skills are more likely to adjust academically to an institution in terms of confidence in their own abilities and their ability to perform consistently at levels which they are satisfied.

One finding which runs in direct contrast to virtually all prior research was the result indicating that interaction with faculty during the freshman year was *inversely* related to gains in the Academic Autonomy task. Sample mean scores, however, showed a slight, but statistically significant increase from pre- to post-test for the this task. This indicates that although an inverse relationship exists, developmental levels are still increasing. Students with higher levels of faculty interaction during the freshman year had lower post-test development levels for the Academic Autonomy task, but still posted overall gains.

Significant indirect effects on post-test developmental level for the Academic Autonomy Model were found for Pre-test Development level (χ^2[5, n=153]= 12.5786, $p<.05$) and Combined SAT Scores (χ^2[5, n=153]= 13.8190, $p<.05$). Indirect effects of Pre-test developmental levels were mediated through Faculty-Student Interaction in college. Developmental level upon entry to the institution was significantly related to levels of interaction with faculty during the freshmen year of college (β= -0.24657, $p< .01$). This indicates that low scorers on the academic autonomy task sought out faculty more frequently than students who had higher scores on this scale. This is

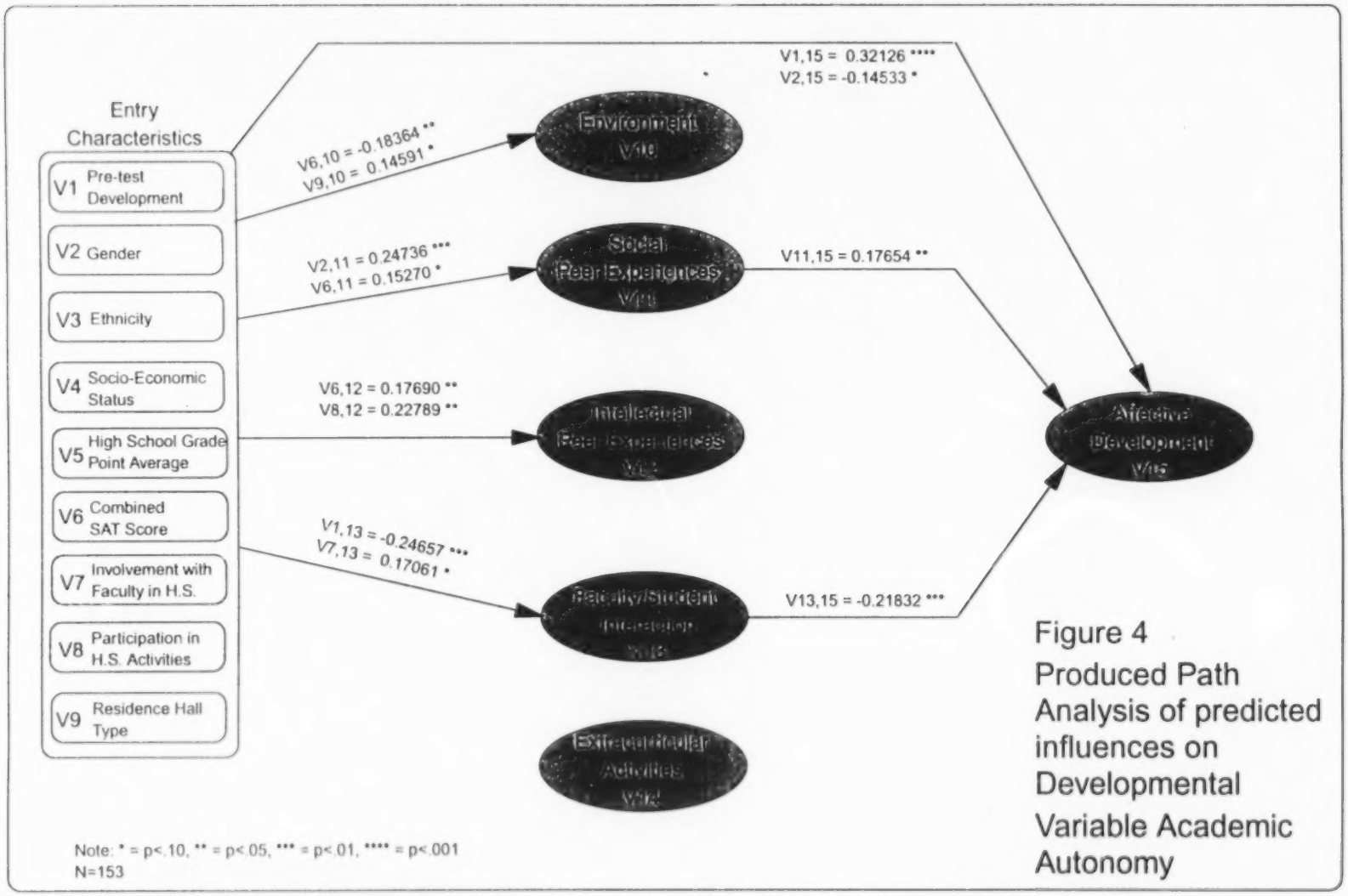
Entry Characteristics
V1 Pre-test Development
V2 Gender
V3 Ethnicity
V4 Socio-Economic Status
V5 High School Grade Point Average
V6 Combined SAT Score
V7 Involvement with Faculty in H.S.
V8 Participation in H.S. Activities
V9 Residence Hall Type
V6,10 = -0.18364 **
V9,10 = 0.14591 *
V2,11 = 0.24736 ***
V6,11 = 0.15270 *
V6,12 = 0.17690 **
V8,12 = 0.22789 **
V1,13 = -0.24657 ***
V7,13 = 0.17061 *
V1,15 = 0.32126 ****
V2,15 = -0.14533 *
V11,15 = 0.17654 **
V13,15 = -0.21832 ***
Affective Development V15
Note: * = p<.10, ** = p<.05, *** = p<.01, **** = p<.001
N=153

Figure 4
Produced Path Analysis of predicted influences on Developmental Variable Academic Autonomy

contrary to the definition of this task, but perhaps in indicative of students who need more help are the ones who most actively seek it out.

Indirect effects of SAT scores on Post-test Development were mediated primarily through Peer Social Interactions. Peer Social interactions were related to SAT scores (β= 0.15270, $p< .10$). This finding indicates that students who score higher on the SAT's prior to college admission had higher levels of peer interaction and subsequently had higher levels of post-test development in the Academic Autonomy Task.

One unique characteristic of the model illustrating relationships for the Academic Autonomy task is that it is the only model, of the five examined, that contained an independent variable without any significant relationships tying it to other components of the model. None of the demographic variables in this study were found to be significantly related to the level of participation in extracurricular activities. Also extracurricular activities had a very little (insignificant) effect on post-test developmental scores for this task. This is not a surprising finding considering that of the independent variables under study, involvement in extracurricular activities is the one area which has no obvious connections to academic development while in college.

The model describing achievement of a Salubrious Lifestyle during the Freshman year was found to have several significant paths describing relationships between variables within the model (See Figure 5). The dependent variable, the measure of the Salubrious Lifestyle scale, was found to have two significant relationships with other variables within the model. Like all of the other structural models, the pre-test score for the same scale was highly significantly related to the post-test score (β= 0.52122, $p< .001$). In addition, participation in extracurricular activities during the freshman year was significantly and positively related to changes in the post- test Salubrious Lifestyle scale score (β= 0.27170, $p< .01$). This finding is easily explained and relatively self-evident. Students who are more active in outside activities, are generally those who find time to take care of their bodies and find ways to reduce everyday stresses. This is consistent with the definition of higher scoring individuals for this scale.

The independent variable examining participation in extracurricular activities during the freshmen year, which was the only significant independent variable for the Salubrious Lifestyle structural model, had two unique relationships with exogenous variables when compared with the other structural model examined. First, pre-test development scores on the Salubrious Lifestyle scale was significantly and positively related to levels of participation in extracurricular activities while in college. Intuitively, this relationship makes sense. Students who have higher

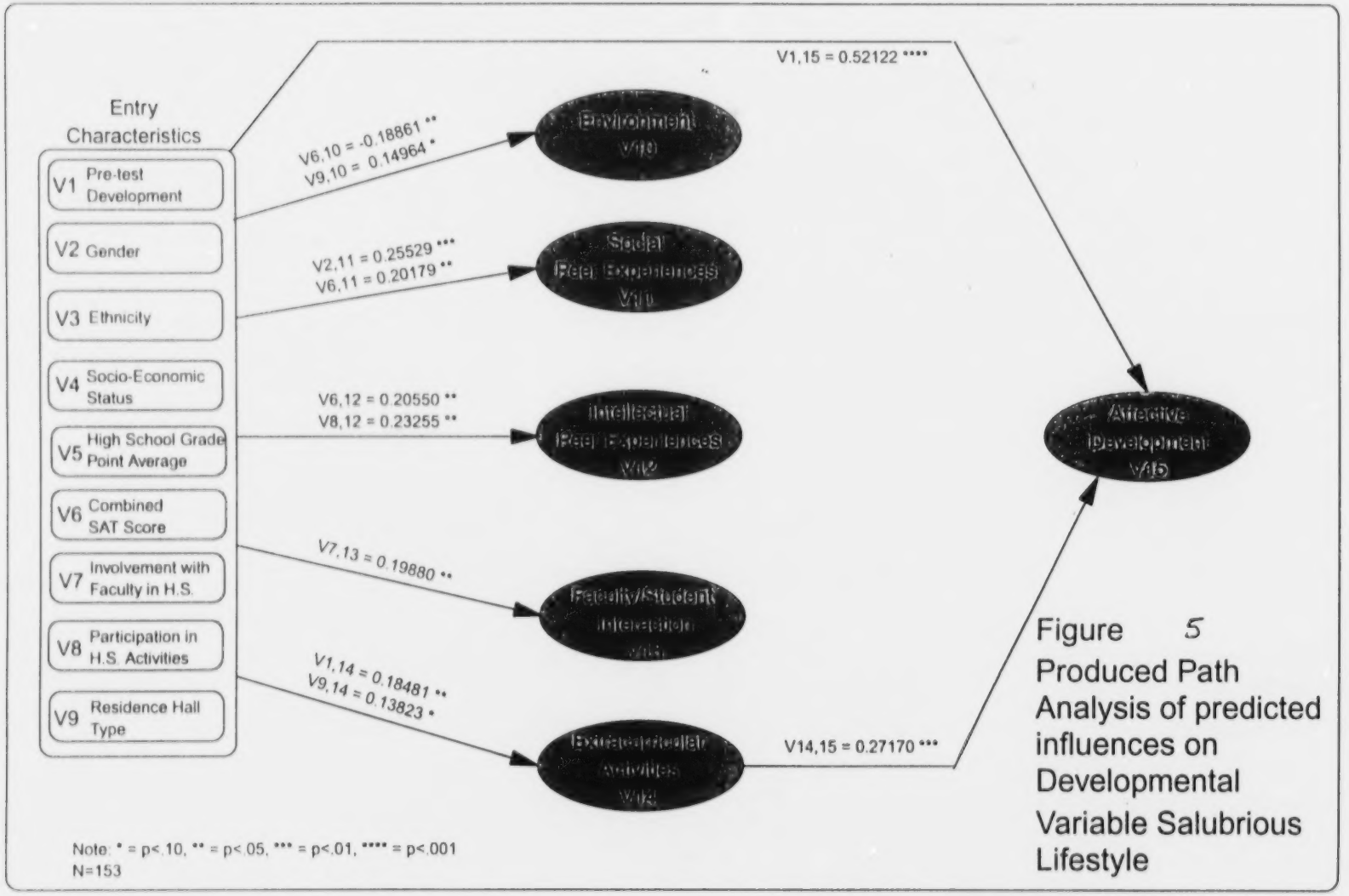
Entry Characteristics
V1 Pre-test Development
V2 Gender
V3 Ethnicity
V4 Socio-Economic Status
V5 High School Grade Point Average
V6 Combined SAT Score
V7 Involvement with Faculty in H.S.
V8 Participation in H.S. Activities
V9 Residence Hall Type
V1,15 = 0.52122 ****
V6,10 = -0.18861 **
V9,10 = 0.14964 *
V2,11 = 0.25529 ***
V6,11 = 0.20179 **
V6,12 = 0.20550 **
V8,12 = 0.23255 **
V7,13 = 0.19880 **
V1,14 = 0.18481 **
V9,14 = 0.13823 *
V14,15 = 0.27170 ***
Note: * = p<.10, ** = p<.05, *** = p<.01, **** = p<.001
N=153

Figure 5
Produced Path Analysis of predicted influences on Developmental Variable Salubrious Lifestyle

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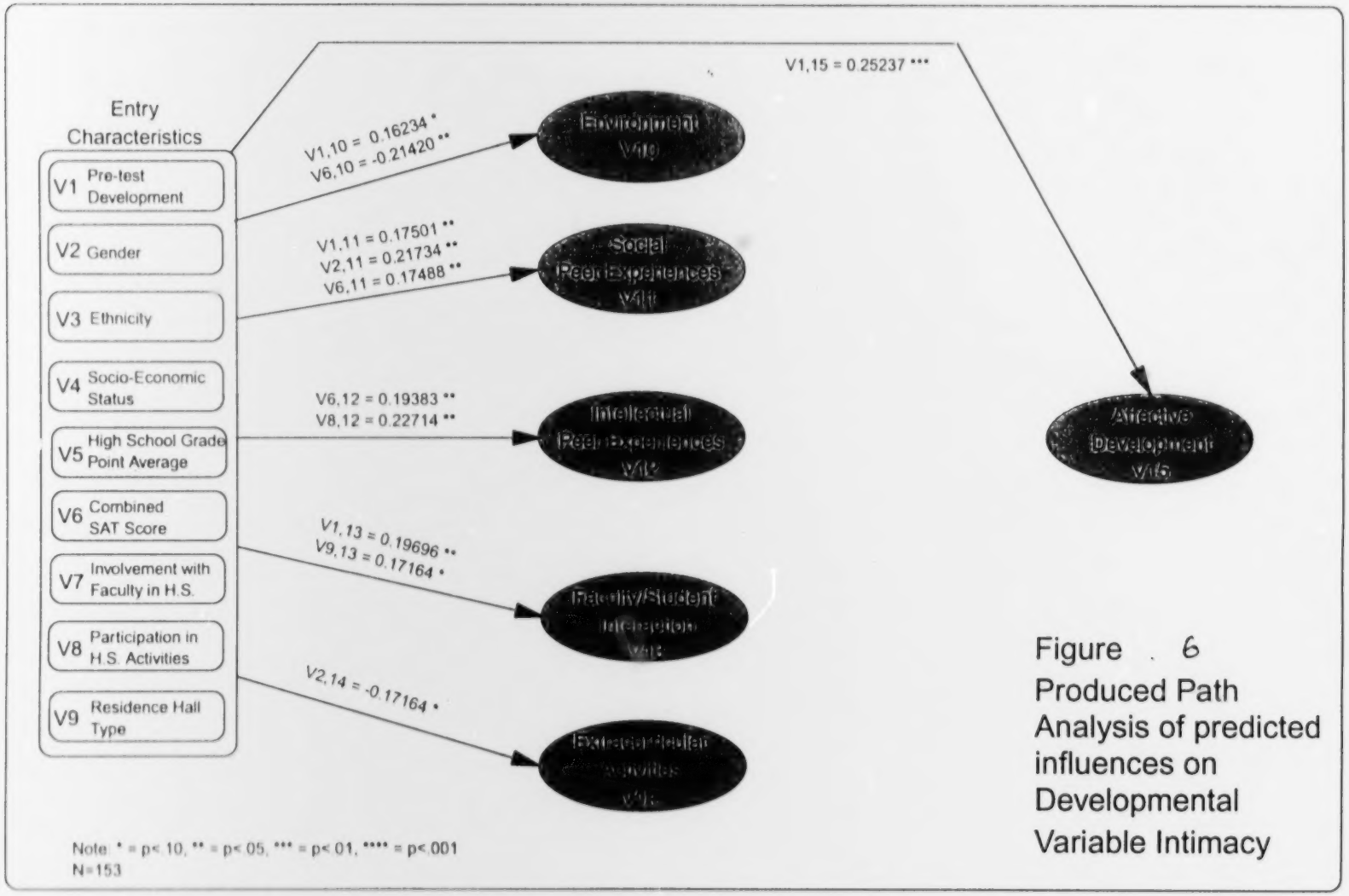
Entry Characteristics
V1 Pre-test Development
V2 Gender
V3 Ethnicity
V4 Socio-Economic Status
V5 High School Grade Point Average
V6 Combined SAT Score
V7 Involvement with Faculty in H.S.
V8 Participation in H.S. Activities
V9 Residence Hall Type
V1,10 = 0.16234 *
V6,10 = -0.21420 **
V1,11 = 0.17501 **
V2,11 = 0.21734 **
V6,11 = 0.17488 **
V6,12 = 0.19383 **
V8,12 = 0.22714 **
V1,13 = 0.19696 **
V9,13 = 0.17164 *
V2,14 = -0.17164 *
V1,15 = 0.25237 ***
Affective Development V15
Note: * = p< .10, ** = p< .05, *** = p< .01, **** = p< .001
N=153

Figure 6
Produced Path Analysis of predicted influences on Developmental Variable Intimacy

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scores on this scale upon entry to college are characterized as managing stress effectively, having a positive self image, active, and demonstrating good health and wellness practices. It is safe to assume that students exhibiting these characteristics would tend to be those who are more involved in activities outside of the classroom.

The other exogenous variable demonstrating a significant relationship with participation in extracurricular activities was residence type (β= 0.13823, $p< .10$). While this relationship was only marginally significant, it indicates that students living in single sex residence halls show higher participation rates in extracurricular activities than their peers in co-ed halls. Perhaps this is a result of students in single sex buildings making more of an attempt to find ways of becoming more involved with members of the opposite sex.

The model describing development of Intimacy during the Freshman year was found to have several significant paths describing relationships between variables within the model (See Figure 6). The dependent variable in the intimacy structural model exhibited only one significant relationship. As has been shown previously, the pre-test score on the Intimacy scale had a highly significant relationship with the score on the post-test Intimacy scale (β= 0.2537, $p< .01$). There were no other significant relationships with the dependent variable. Perhaps this is due to the "experimental" nature of the intimacy scale as described by the authors of the SDTLI instrument from which these scores are derived (Winston and Miller, 1987).

Discussion and Conclusions

The results of the study described in this document indicate that several of the variables examined for their predicted impact on affective student development had significant effects on several developmental measures during the freshman year. Informal interaction with faculty was found to significantly impact affective student development variables in two of the five models studied. This concurs with most prior research which illustrates that faculty interaction with students is one of the predominant influences on developmental change among students (Chickering 1974; Wilson et al., 1975; Pascarella and Terenzini, 1976; Pascarella and Terenzini, 1978; Terenzini and Wright, 1987b; Pascarella and Terenzini, 1991; Chickering and Reisser, 1993). In addition, this study found that participation in various extracurricular activities had significant effects on post-test developmental levels in two of the five models examined. This again concurs with previous research showing that participation in extracurricular activities leads to gains in developmental levels (Jackson, 1977; Miller and Jones, 1981; Thomas,Morrell and Chickering,

1982; Astin, 1984; Parker and Aldridge, 1986; Winston and Massaro,1987; Abrahamowicz, 1988; Ryan, 1989; Pascarella and Terenzini, 1991; Chickering and Reisser, 1993). Finally, Peer Social Experiences were found to have significant effects on post-test developmental level for one of the models examined by this study. Once again, this confirms prior research illustrating the effects of peer influences on student development outcomes (Chickering, 1974; Moos, 1979; Kaufman and Creamer, 1991; Pascarella and Terenzini, 1991; Chickering and Reisser, 1993).

Two of the independent variables examined, measures of the Environment and Peer Intellectual Interactions, had no significant relationship with development in this study. These findings could be due to any number of research issues including sampling problems, inadequate duration for the study, inadequate power of the instrumentation, or the possibility that no relationship actually exists.

One of the purposes of this study, as identified by the research questions, was to provide a test of Chickering's Theory of Student Development through the concurrent measurement over the course of an academic year of four of the six factors Chickering deemed important in influencing change along the developmental vectors he established. Current research indicates this type of "test" has never been conducted. The results of this study provide a partial validation of Chickering's Theory of Student development by confirming that development is occurring *and* that the environmental measures predicted to influence development, do, indeed, have significant impacts on developmental change.

Chickering originally proposed seven vectors of development for the typical college student: (1) Developing Competence; (2) Managing Emotions; (3) Developing Autonomy; (4) Establishing Identity; (5) Mature Interpersonal Relationships; (6) Clarifying Purpose; and (7) Developing Integrity. These vectors are purported to follow a roughly sequential pattern from freshman to senior year in college. Given the limited nature of this research and the availability of quality measures of these developmental tasks, this study considered three of these tasks completely and partially assessed other areas encompassed within the remaining tasks (see Table 4).

In addition to the developmental vectors, Chickering postulated that there are several factors which have key influences over students during their college career: (1) Clear and Concise Institutional Objectives; (2) Institutional Size; (3) Student-Faculty Relationships; (4) Curriculum and Teaching; (5) Residence Hall Arrangements; (6) Friendships and Student Communities; (7) Student Development Programs and Services; and (8) Creating educationally

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Table 4
A Comparison of Chickering's Vectors and Scales Measured by the Student Development Task and Lifestyle Inventory

Chickering's Vectors (Chickering, 1993)	Related SDTLI Measures (Winston and Miller, 1987)
• Developing Competence	
• Managing Emotions	
• Moving Through Autonomy Toward Interdependence	• Academic Autonomy Task
• Developing Mature Interpersonal Relationships	• Developing Mature Interpersonal Relationships Task Intimacy Scale
• Establishing Identity	• Salubrious Lifestyle Scale
• Developing Purpose	• Clarifying Purpose Task
• Developing Integrity	

powerful environments (Chickering, 1969, Chickering and Reisser, 1993). Due to the limited nature the current research, factors concerning institutional objectives, institutional size, and curriculum and teaching could not be considered by the present study (see Table 5).

Findings from this study indicate that statistically significant developmental change occurred during the freshman year on three of the five developmental measures examined. Of the other two measures, one showed an insignificant increase and the other, an insignificant decrease in developmental level. This is consistent with Chickering's original predictions that, in general, development should proceed in positive directions throughout the student's academic career. He does not, however, discount negative development.

Second, in addition to significant positive developmental growth, this study found significant relationships between several of the environmental variables predicted to influence developmental change in the vectors examined. These changes were consistent with Chickering's original hypotheses regarding these vectors. In the areas of faculty-student interactions, participation in activities, peer interactions and residence arrangements, the results of this study confirm Chickering's original hypotheses regarding developmental influences. These environmental influences demonstrate significant relationships with positive changes in affective development along several of the vectors. This illustrates that not only is there proof concerning Chickering's ideas regarding the

Table 5
Comparison between Chickering's (1993) Hypothesized Influences on Development and Measures Derived for the Current Study

Chickering's Hypothesized Developmental Influences (Chickering, 1993)	Related Measures Derived from the Student Information Form and CSEQ (Pace, 1992)
• Clarity of Institutional Objectives	
• Institutional Size	
• Faculty- Student Contact	• Faculty- Student Contact
• Teaching	
• Curriculum	
• Friendships and Student Communities	• Peer Social Relationships Peer Intellectual Relationships Residence Hall Type
• Student Development Programs and Services	• Participation in Extracurricular Activities
• Creating Educationally Powerful Environments	• Environmental Ratings

process of development, but it also validates the *supposed causes* of development at the same time.

These two findings support and reinforce Chickering's hypotheses that developmental change does occur *and* that the environmental measures predicted to influence development, do, indeed, have significant impacts on developmental change. Together, they provide direct validation of much of Chickering's Theory of Student Development. This latter point is important because Chickering's Theory of Development is one of the most prominent theories guiding student development practice at literally hundreds of college campuses across the country. Although Chickering and numerous others have provided endless amounts of documentation to support his theory, prior to this research, it has never been subject to a direct empirical test regarding both the theory *and* the presumed influences of development.

One finding which runs in direct contrast to virtually all prior research was the result indicating that interaction with faculty during the freshman year was *inversely* related to gains in the academic autonomy task. Sample mean scores, however, do show a slight, but statistically significant increase from pre- to post-test for the Academic Autonomy task. This indicates that although an inverse relationship exists, developmental levels are still increasing.

Students with higher levels of faculty interaction during the freshman year had lower post-test development levels for the Academic Autonomy task, but still posted overall gains.

Perhaps this unusual finding is related to another finding in this particular model which indicates that students with higher pre-test developmental score in the Academic Autonomy task have lower levels of faculty interaction. As the results of the research indicate, pre-test developmental level is indirectly related to post-test development, mediated by Interaction with Faculty. One possibility is that higher ability students and those with greater confidence in their own abilities may not feel the need for interaction with faculty outside of the classroom. Even though they have not had additional contact with faculty, it is reasonable to assume that this same subgroup is likely to remain successful and gain in academic confidence as their college experience progresses. Conversely, low pre-test scorers have higher levels of interaction with faculty during the freshman year, perhaps in an effort to aid in their academic performance. Even though they are involved to a greater degree with faculty during this year, these student's gains in post-test development (academic self-confidence) are not likely to develop as much as higher pre-test scorers.

Several other reasons for this unexpected finding include possible overstimulation by faculty in the residence halls. Students may have such significant levels of contact that they become confused by the wealth of information and suggestions. Another equally plausible explanation is that because this study has only covered one year, the "threshold" level of contact with faculty to enhance development has not yet been reached. Study of the population over a four year period may provide more expected results in this area.

In attempting to validate Chickering's theory, one issue regarding the current research study lies in the choice of vectors examined and the general sequencing of the original vectors as proposed by Chickering. Two of the areas examined, Developing Purpose and Mature Interpersonal Relationships, were originally considered "upper level" tasks by Chickering. Considering this research examined only freshmen students, this could be interpreted as being potentially limiting to the results of the study. However, more recent research by several authors, including Chickering himself, has questioned the sequencing of the developmental tasks (Mines, 1978; Erwin, 1978; Riahinejad and Hood, 1984; Chickering and Reisser, 1993). Chickering and Reisser (1993) indicate they proposed a sequence to suggest that certain building blocks make a good foundation in the total scheme of student development. They note that some tasks are *more likely* to be encountered early along in the scheme of

development, but that different students experience different tasks at different times. The sequencing is not absolute. Development can be occurring in all areas at all times during the college experience. This study found significant positive development in three of the five developmental areas examined, including Development of Purpose, providing partial validation for these suggestions regarding sequencing of the vectors.

Another issue concerning the overall validation of Chickering's Theory of Student Development is the amount of the variance explained by the five developmental models examined. It had been anticipated that pre-test development scores would account for a significant portion of the total variance explained in each of the five models examined. This is due to the fact that both pre- and post-test developmental measures area based on the identical instrument (the SDTLI).

Four of the models examined in this study had statistically significant amounts of the variance explained for the total model. However, when the total model variance is viewed relative to the amount of variance explained by the pre-test development variable, the amounts of variance explained by the each five endogenous variables becomes relatively small. This indicates that the independent variables examined by these models account for only a small portion of the reasons for developmental change in the students studied.

Possible explanations for these findings include that sections SDTLI instrument may not be sensitive enough to be able to discriminate change over the course of a single year. Another explanation for these findings concerns the nature of the population under study. The institution under examination has a *very* homogeneous student body. Pascarella and Terenzini (1991) indicate that when examining peer interactions, exposure to homogeneous, like-minded groups may act to insulate against development. Since the population under study is very one dimensional, perhaps because they are so similar, change is stifled, rather than fostered.

A final possible explanation for the lack of variance explained by the environmental variables examined concerns the effects of cognitive/ intellectual development. This study limited its scope to affective development and did not consider the important realm of cognitive/ intellectual development. Pascarella and Terenzini (1991) suggest that cognitive development is undeniably part of the whole development picture along with affective development. The two sides mutually reinforce the effects of the other. Individually, intellectual/ cognitive and affective development are not nearly as explanatory. By not considering one-half of the developmental equation, a more accurate and complete assessment of affective development could not be attained.

The findings of this study confirm that the independent variables examined in three of the five models examined were generally effective in explaining variance in post-test developmental levels above and beyond that accounted for by pre-test developmental levels. This illustrates that the SDTLI instrument is, along some of the developmental vectors, able to discriminate change over the course of a single year.

The third and final research question proposed by this study was to identify the independent variables that were most effective in producing positive change in post-test development given certain entry characteristics and the practical implications that these changes might imply. As reported previously, several of the environmental variables examined (faculty student interactions, participation in activities, and peer interactions) produced significant relationships with post-test developmental change. This study validates many other studies in identifying the major influences effecting student development change. However, it goes one step further than most studies in that it considers multiple measures of the environment and their effects on developmental change *simultaneously*. Most studies in the existing literature examine one or two of the presumed causes independently. Such simultaneous measures lend additional credence to the significance of the influences of the interactions with faculty and peers. They provide a relative measure, in direct comparison with other environmental influences of the effects of these key influences on affective student development.

This study will have utility for practitioners in that it corroborates much of what we already assume to be true by affirming and confirming the rationales of a commonly used theory of development in an empirically based manner. It lends additional evidence supporting the claims made by Pascarella and Terenzini (1991) that a large part of the impact of college is determined by the extent and contact of one's interactions with the major agents of socialization on campus, namely, faculty members and student peers. This study illustrated that the predominant influences on selected vectors of student development are faculty-student interactions, interaction with peers, and participation in activities with peers.

This study re-emphasizes the necessity for faculty and students to seek out one another and interact so that students may benefit developmentally from these interactions. Pascarella and Terenzini (1991) state that "the educational impact of a college's faculty can be enhanced when their contacts with students extends beyond the formal classroom" (p. 620). It also points out the need for student affairs and academic affairs to work cooperatively at our institutions to foster the best possible developmental environment.

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Another implication for professional practice is the area of intentionally- structured activities designed to foster positive developmental growth. This study found that participation in a wide variety of extracurricular activities, from intercollegiate athletics, to exposure to the arts, to group discussions on developmental issues such as sexuality and career exploration, to participation in campus or residence hall social events, have a significant effect on areas of development for college freshman. This study supports the existing literature in calling on institutions to provide for its students *and* to encourage its students to participate in a wide variety of social, cultural, educational and recreational programming. These efforts should be directed at providing students exposure to a wide variety of ideas, cultures and methods of expression, so that development in all areas is encouraged. Developing and encouraging a wide variety of participation opportunities will also indirectly facilitate peer interactions, the third and final area shown by this study to be significantly related to developmental change over the course of the freshman year.

Additional, this study has implications for practice concerning predictors of involvement and interaction in college prior to entry to college. Two of the exogenous variables examined, SAT scores and participation in activities in high school, were consistently found to be significantly and positively related to peer intellectual interactions while in college. Perhaps this is indicative of better and more involved and well-rounded students being more intellectually involved in their college experiences. Levels of involvement with faculty in college were also consistently shown to be significantly and positively related to levels of interaction with faculty while in high school in four of the five models examined. This finding supports prior research which predicts that students predisposed to frequent interactions with faculty while in high school will most likely continue these interactions during their college experience. Both of these findings reinforce the literature and provide additional evidence for college and secondary school administrators regarding the importance of students getting involved and working hard prior to entrance to college.

A final implication of this study for student affairs practitioners is the establishment of an exemplary student involvement pattern for the freshman year that will potentially influence the most positive developmental changes. Examination of these environmental variables together has suggested that three of the environmental variables studied have significant effects during the freshman year. Student affairs and academic administrators should use this information to encourage and foster future development of students through counseling and suggestions of activities or directions that may be helpful to the student. Through such encouragement and direction, students

should be able to attain higher levels of development than they might have if their experiences were simply left to chance. Through this increased development, students should leave college better prepared, enabling them to better face and cope with the pressures and realities of modern society.

Limitations

While this study has shown that there is partial empirical support for Chickering's Theory of College Student Development, there are several limitations which potentially impact upon the significance of this research. One of the most obvious limitations of this study is that it involves data from a single institution. This raises concerns regarding the generalizability of the results. Second, this study does not consider all of Chickering's vectors or all of the hypothesized influences on student development. This prevents full validation Chickering's theory. Third is the ability to discriminate change over the course of a single year. While the freshmen year has been identified in the literature as being one of significant changes, it is only a fraction of the college career.

Another potential limitation is that all of the data collected from the pre- and post-tests are self reported data. Self-reported data may result in problems if students are not honest and/or consistent in their answers to questions, or if a reference point is not clearly established for all questions asked. Finally, another potential limitation of this study, as with any study which examines developmental change, is separating the effects of normal maturation from the effects of the various factors thought to be influencing the change. This is potentially problematic in deciding whether any changes discovered are a result of the influences of the college experience, or simply as a result of normal maturation.

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